

## CS3 CASE STUDY RUBRIC: Forecasting the UVA Tuition Gap

### Project Goal:

Students will analyze historical UVA tuition data (1970-2025) and apply time-series forecasting models to determine whether the tuition gap between in-state and out-of-state students is projected to continue widening through 2030.

### 1. Data Preparation and Feature Engineering (20 points)

Criteria	Excellent (18-20)	Satisfactory (14-17)	Developing (10-13)	Incomplete
Data Import	All tuition files correctly imported and combined	Minor data issues	Partial data used	Incorrect dataset
Feature Creation	Tuition_Gap engineered correctly	Gap created with small flaws	Logic unclear	No gap variable
Time Index	Year_Start correctly used as time index	Minor alignment issues	Improper indexing	No time index
Data Integrity	Missing values checked and handled	Some validation	Limited validation	Not validated

### 2. Exploratory Analysis and Trend Detection (20 points)

Criteria	Excellent (18-20)	Satisfactory (14-17)	Developing (10-13)	Incomplete
Trend Visualization	Clear tuition + gap trends shown	Some visualization	Weak visuals	None
Rolling Statistics	Mean & variance used to assess growth	One used	Misused	Not used
Stationarity Testing	ADF test correctly applied	Test used incorrectly	Weak explanation	No test

### 3. Forecasting Models (25 points)

Criteria	Excellent (23-25)	Satisfactory (18-22)	Developing (13-17)	Incomplete
Holt's Linear Trend	Implemented and interpreted	Implemented only	Incorrect use	Not included
ARIMA	Differencing + parameters justified	Model fit but weak logic	Incorrect setup	Not included
Prophet	Changepoint forecasting used correctly	Prophet used weakly	Misconfigured	Not included

### 4. Model Validation & Performance (20 Points)

- Project Benchmarks
  - MAPE  $\leq 7\%$ ,  $R^2 \geq 0.80$ , Correct directional prediction for last 5 years

Criteria	Excellent (18-20)	Satisfactory (14-17)	Developing (10-13)	Incomplete
Metrics	All three benchmarks evaluated	Two metrics used	One metric	none
Accuracy	Project meets all benchmarks	Some benchmarks met	Weak performance	Not evaluated
Forecast Horizon	Forecast through 2030	Partial forecast	Short range	No forecast

### 5. Interpretation, Bias, & Policy Meaning (15 points)

Criteria	Excellent (14-15)	Satisfactory (11-13)	Developing (7-10)	Incomplete
Bias & Uncertainty	Inflation, funding, and policy limits addressed	Some bias addressed	Minimal	none
Interpretation	Clear explanation of widening gap	Some interpretation	Weak	None
Policy Insight	Strong affordability implications	Limited policy link	Surface-level	None

**Total: 100 Points**